

ATTACHMENT A
Remarks

Claims 1, 5-30, 35-44, 46 and 49-52 are pending in the present application. By this Amendment, Applicants have amended claim 30. Applicants respectfully submit that the present application is in condition for allowance based on the discussion which follows.

Claims 30, 35, 36, 38-40, 46 and 49-52 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Cisar (U.S. Patent No. 6,492,431) or Cisar (U.S. Patent No. 5,635,039) (hereinafter "Cisar '431" and "Cisar '039, respectively, and the "Cisar references," collectively). In the rejection, it was alleged that the Cisar references teach various aspects of the claimed multi-segmented fluoropolymer that comprises a block copolymer and/or a graft copolymer. The Examiner admits that the Cisar references do not teach molecular weights for segment A and segment B. However, the Examiner alleges that the Cisar references disclose materials that comprise segment blocks containing polytetrafluoroethylene groups ("PTFE") and perfluorovinyl esters with sulfonic acid functional groups commonly known as Nafion. The Examiner alleges that it would have been obvious to one of ordinary skill in the art at the time the invention was made to alter the amount of each material in order to provide a material having a desired size, strength or ionic conductivity depending on the desired application.

In order to further distinguish the present multi-segmented fluoropolymer that comprises a block copolymer and/or a graft copolymer, Applicants have amended claim 30 to now recite that segment B is a fluoropolymer containing no sulfonic acid functional groups having a molecular weight of 3,000 to 1,200,000, and the ratio of segment A : segment B in the segmented fluoropolymer is 5:95 to 98:2 wt. %. Support

for the amendment to claim 30 can be found in the specification, as filed, on page 23, lines 11-17 and page 28, lines 3-4. Therefore, the amendment to claim 30 does not constitute new matter.

The presently claimed copolymer comprises segment B present in at least 2 wt. % or more based on the ratio of segment A : segment B in the copolymer being 5:95 to 98:2 wt. %, and the segment B having a molecular weight as high as 3,000 to 1,200,000. Referring to the specification for exemplary purposes only, Examples 1 and 2 on pages 31, line 23-page 35, line 8, disclose segment A is first synthesized, and then the segment B with a high molecular weight is formed on the segment A, in order to obtain a copolymer comprising segment B with a high molecular weight of 3,000 to 1,200,000 in a proportion of 2 wt. % or more.

The copolymer comprising segment B with a molecular weight as high as 3,000 to 1,200,000 in a proportion of 2 wt. % or more cannot be obtained simply by mixing the monomer of segment A and the monomer of segment B, and allowing them to react. The present specification fully enables the preparation of the claimed copolymer that comprises a block or graft copolymer segment A and segment B by separately synthesizing segment A and segment B.

The present ratio of segment A : segment B results in a fluoropolymer having excellent mechanical properties, even at high temperatures.

The presently claimed multi-segmented fluoropolymer is novel and non-obvious in view of the Cisar references as there fails to be any apparent reason to prompt a person of ordinary skill in the relevant art to modify the disclosure of the Cisar references to arrive at the claimed invention. Moreover, the Cisar references,

individually or in combination with what would have been known to one of ordinary skill in the art, fail to provide an enabling disclosure in order for one of ordinary skill in the art to practice the invention, especially with regard to the manufacture of the claimed multi-segmented fluoropolymer.

The Cisar references fail to teach one of ordinary skill in the art how to practice the claimed invention. Cisar '831, column 7, lines 15-30, states "[The] methods of the invention comprise extruding and processing a polymer-block type composite membrane using the same techniques that may be used in fabricating a conventional random polymer membrane." With the techniques used in fabricating a conventional random polymer membrane as taught by Cisar, however, there is very little probability of obtaining a "block" of segment B with a molecular weight as high as 3,000 to 1,200,000. The molar ratio of tetrafluoroethylene ("TFE") in commercially available Nafion is about 86.7%. The molecular weight of TFE (CF_2CF_2) is 100.

Hence, assuming that the molar ratio of TFE is 86.7%, the probability of the formation of a segment that consists only of TFE and has a molecular weight of 3,000 in, for example, "Nafion" disclosed by Cisar is given as follows:

$$(0.867)^{(3,000/100)}=1.38\%.$$

Similarly, in the case of such a segment with a molecular weight of 5,000, the probability is given as follows:

$$(0.867)^{(5,000/100)}=0.0796\%.$$

Accordingly, because there is very little probability of the formation of a segment B with a molecular weight as high as 3,000 to 1,200,000 in "Nafion" disclosed by Cisar, Cisar does not clearly disclose a copolymer comprising such a segment B in a

proportion of 2 wt. % or more. The present invention is thus clearly unobvious over the Cisar references.

Moreover, there fails to be any apparent reason why one of ordinary skill in the art would have modified the molar ratios of the Cisar references to arrive at the claimed ratios. Although the Examiner provides a conclusionary statement that it would have been obvious to one of ordinary skill in the art at the time the invention was made to alter the amounts of each material in order to provide a material having a desired size, strength or ionic conductivity depending on the desired application, the Examiner has failed to allege any facts supporting such a conclusion. For example, the Examiner has failed to provide any metric or criteria which a person of ordinary skill in the art would use in order to arrive at the claimed composition and, in particular, the claimed ratios of constituents, namely segment A : segment B, or the molecular weight of segment B. In addition, the Examiner has failed to provide any facts which would support or enable one of ordinary skill in the art, based on the Cisar references, to produce the claimed multi-segmented fluoropolymer having the claimed molecular weight ranges and ratio of segment A to segment B. Further, the Examiner has not provided any facts supporting why a person having ordinary skill in the art would choose the claimed ratios or molecular weight, or what benefit would be achieved in doing so.

Based on the foregoing, Applicants respectfully submit that claims 30, 35, 36, 38-40 and 49-52 are not obvious in view of the Cisar references.

In view of the foregoing, Applicants respectfully submit that the present application is in condition for allowance.

END REMARKS